Ocean Country Partnership Programme

GIS and Remote Sensing Training

UK Government

Written Instructions

UNLIMITED ACCESS TO SELF-PACED E-LEARNING

Programming Scripts

Videos

Open-source vs. Commercial Software

Training Modules

1. QGIS

Module 0: Introduction to GIS and QGIS
Module 1: Map Creation
Module 2: Data Visualisation and Query
Module 3: Digitisation
Module 4: Coordinate Reference Systems
Module 5: Raster
Module 6: Spatial Analysis
Module 7: Spatial Analysis- case study
Module 8: Intro to Data Collection using QField Application and QGIS

More information: pages 3 -10

2. ArcGIS Pro

Module 1: Introduction to ArcGIS Pro
Module 2: Data Creation and Handling
Module 3: Spatial Analysis
Module 4: Cartography
Module 5: Python Environment

More information: pages 11 - 17

4. ArcGIS Online or Enterprise

Module 1: Intro to ArcGIS Enterprise and Online
Module 2: Intro to ArcGIS Web Applications
Module 3: Intro to StoryMaps

More information: pages 18 - 22

3. Remote Sensing and Pollution

Module 1: River Plume Mapping Using Ocean Colour
Module 2: River Catchment Modelling with QSWAT+ (Hydrological Modelling)

More information: pages 19 - 27

4. In development

Please refer to page 27 for more information on the training modules that we are currently developing.

1. QGIS Training Modules

Requirements and skills gained

Minimum hardware requirements: Laptop or PC 

Minimum software requirements: Long-term- release (LTR) QGIS Desktop 

Internet Access: Yes (to download data and software)

License: No

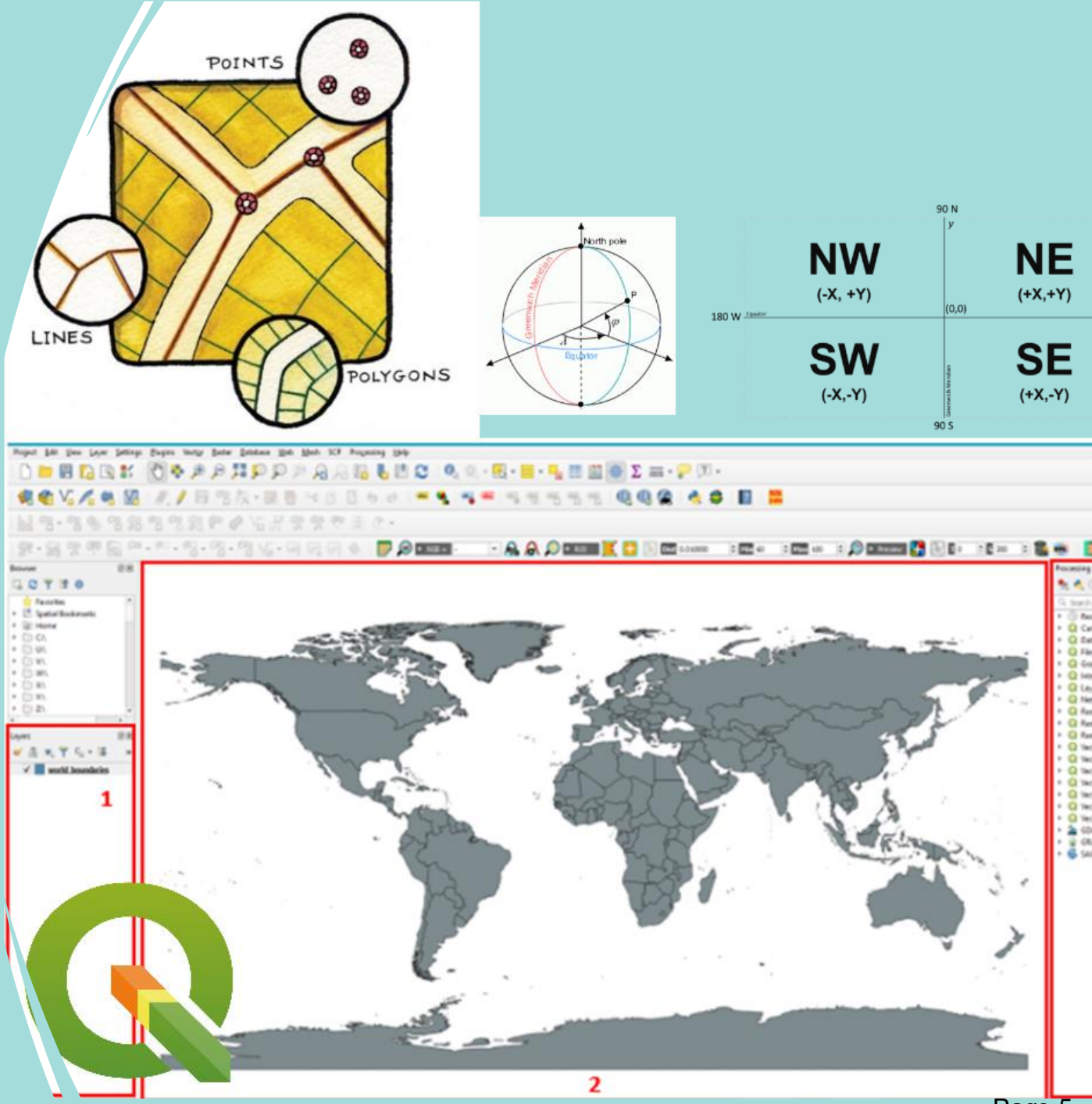
Aims of the modules: provide general GIS skills and concepts 

Use of the modules: GIS concepts, creating spatial data, cartography, mapping 

GIS user level: Beginner

QGIS Module 0: Introduction to GIS and QGIS

- **Introduction to spatial concepts (GIS):**
  - Geographic and cartesian coordinates, projections, spatial data models
- **Introduction to QGIS:**
  - QGIS layout
  - Adding data
  - Changing projections



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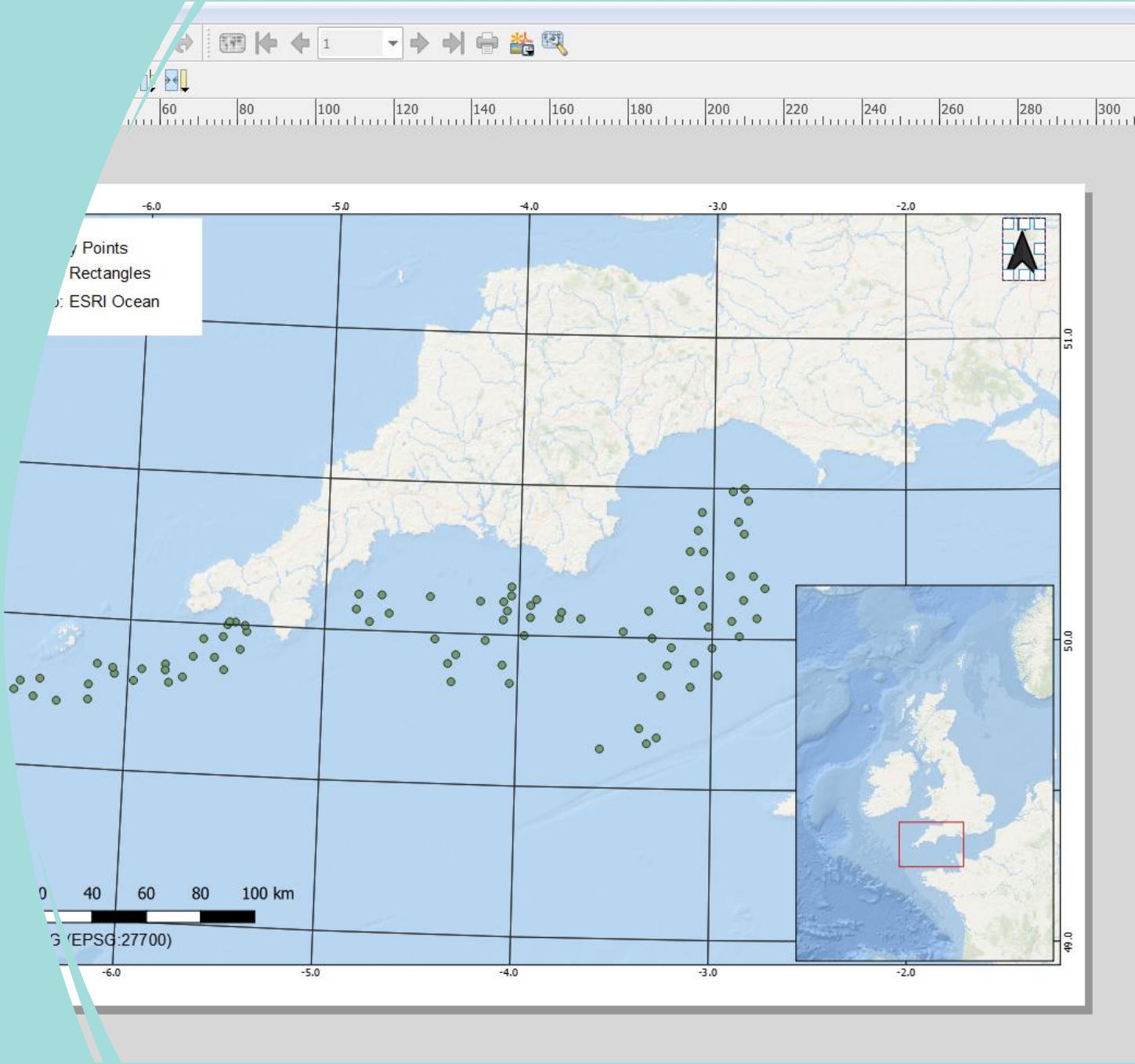
QGIS Module 1:
Map Creation

- QGIS **Plugin** Installation
- **Creation of points**
- Adding **basemaps**
- **Map composer**:
  - Grids
  - Legend
  - Text box
  - Inset map
  - Scale bar



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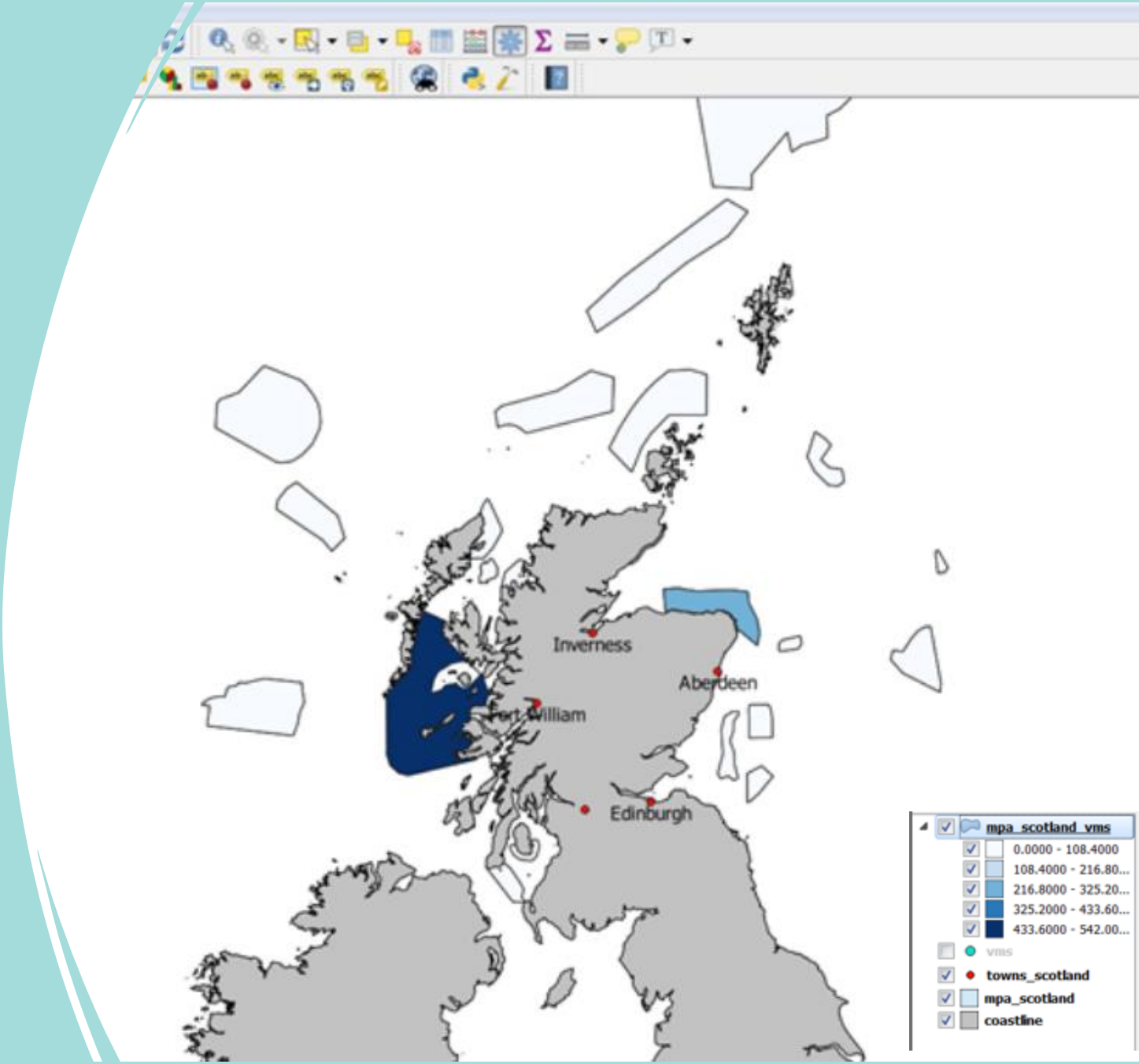
QGIS Module 2:
Data Visualisation and Query

- **Labelling**
- Data Query
- **Symbology**
- Creating **new fields**
- **Calculate** the **number of points** in the MPAs
- Calculate area



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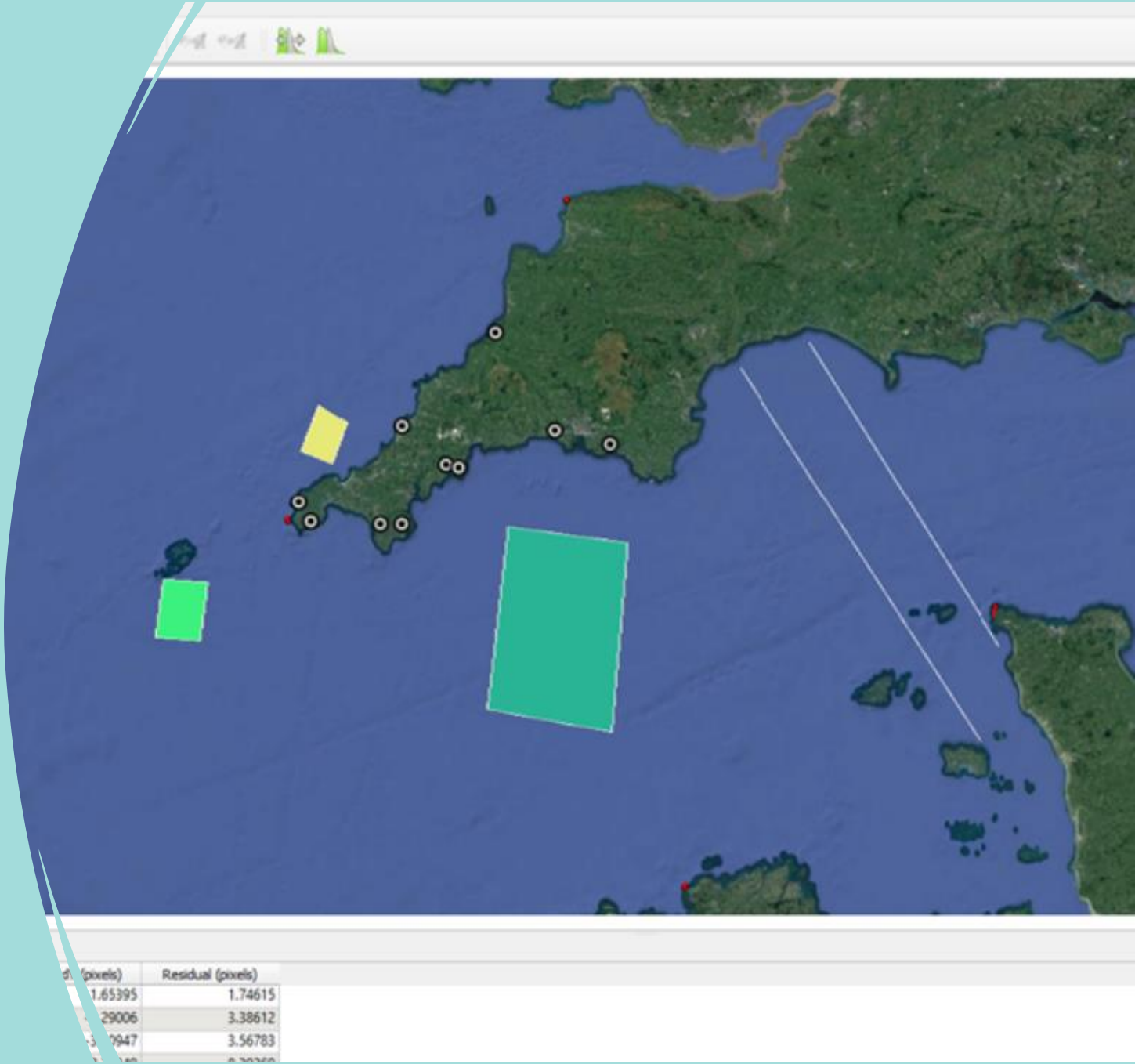
QGIS Module 3: Digitisation

- Bookmarks
- Georeferencing an image
- Digitise lines, points and polygons



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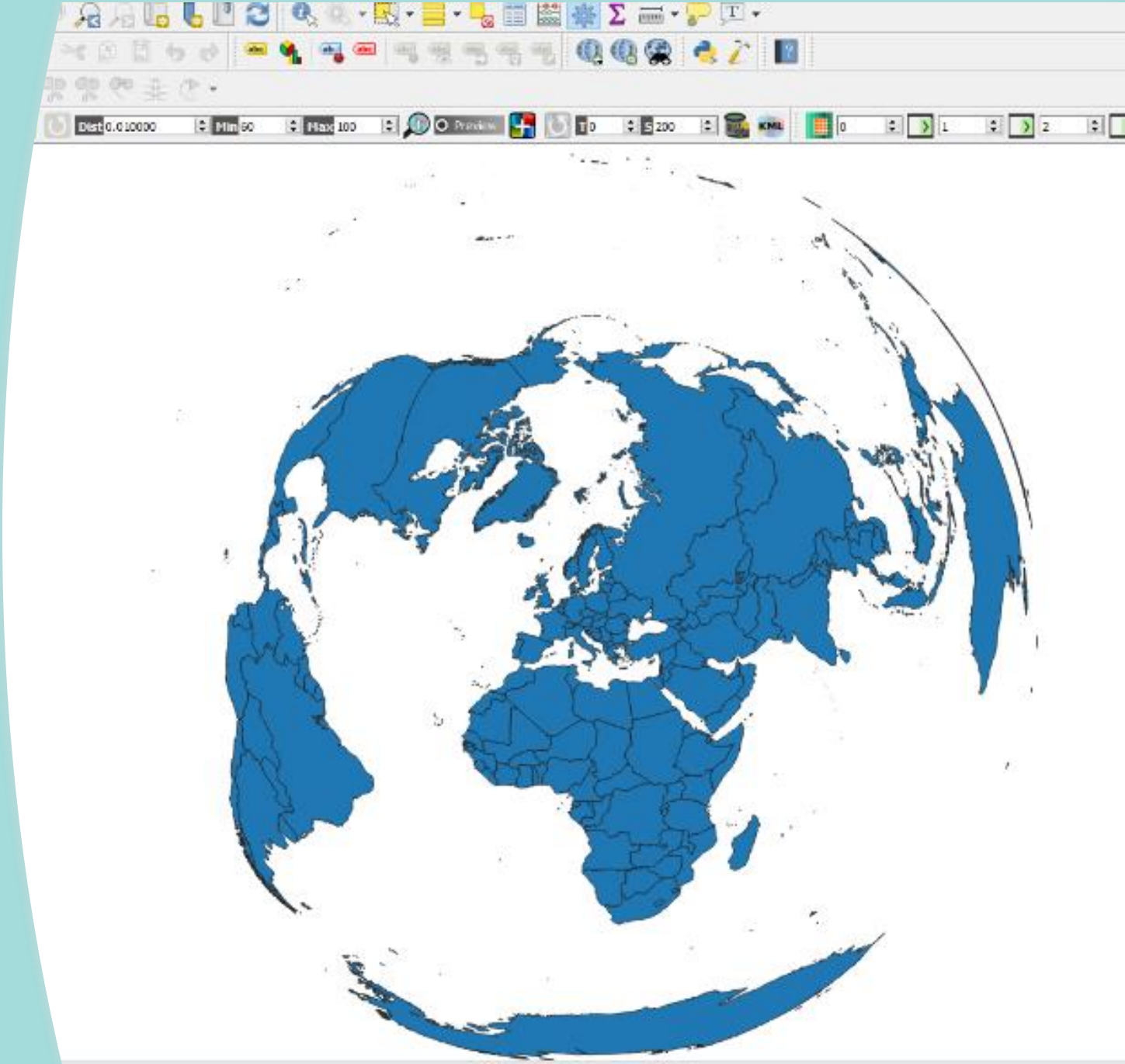
QGIS Module 4:
Coordinate Reference Systems

- **Introduction** to **coordinate reference systems** (geoid, ellipsoid, datum, projections, transformations)

- Hands on examples in **QGIS** on how the **projections** influence the **shapes (angles), distances or areas**.



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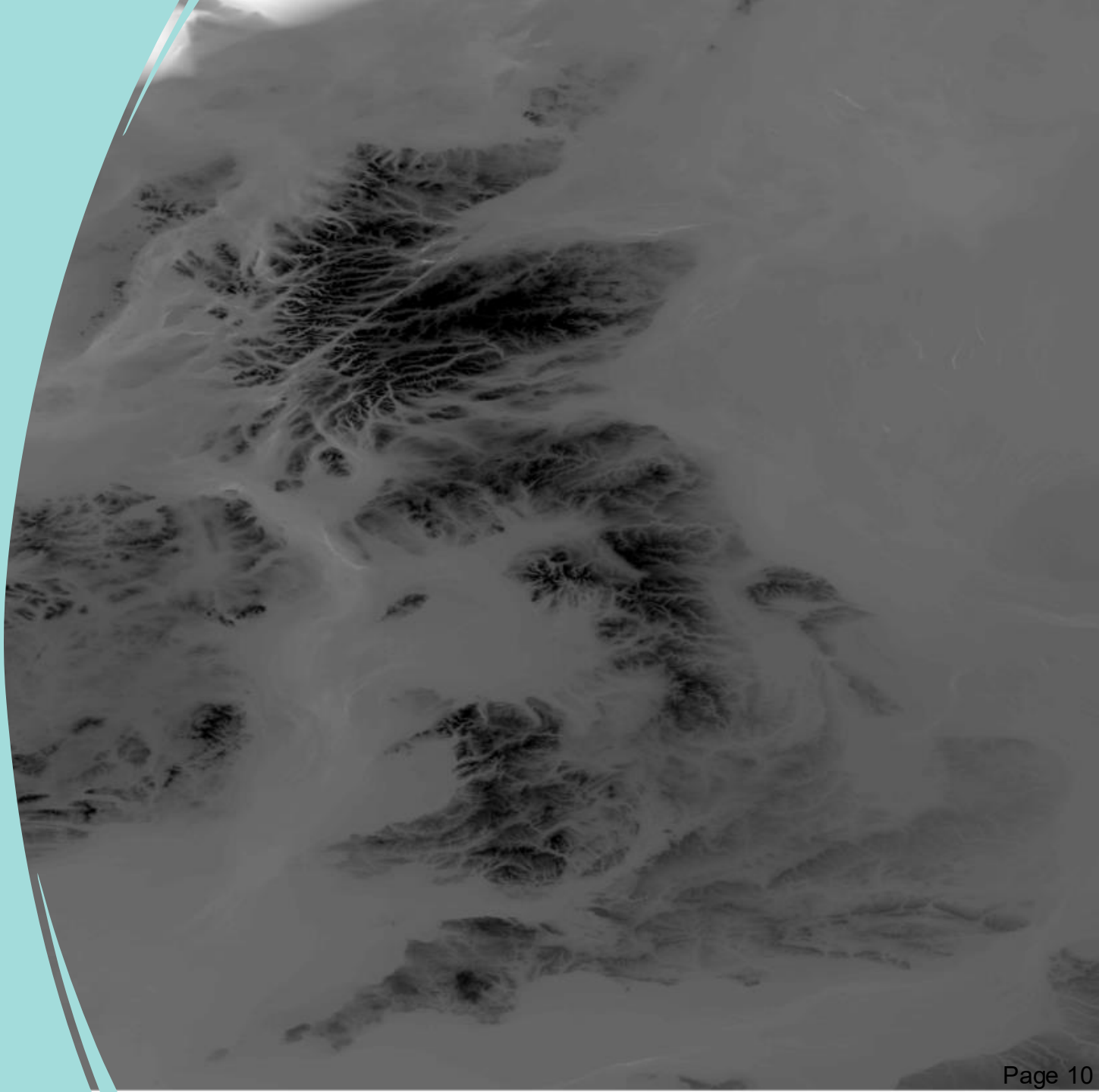
QGIS Module 5:
Raster

- **Loading rasters**
- **Mosaics (virtual raster)**
- Perform basic raster analysis using **raster calculator**
- **Symbology**
- Loading **netCDF** files



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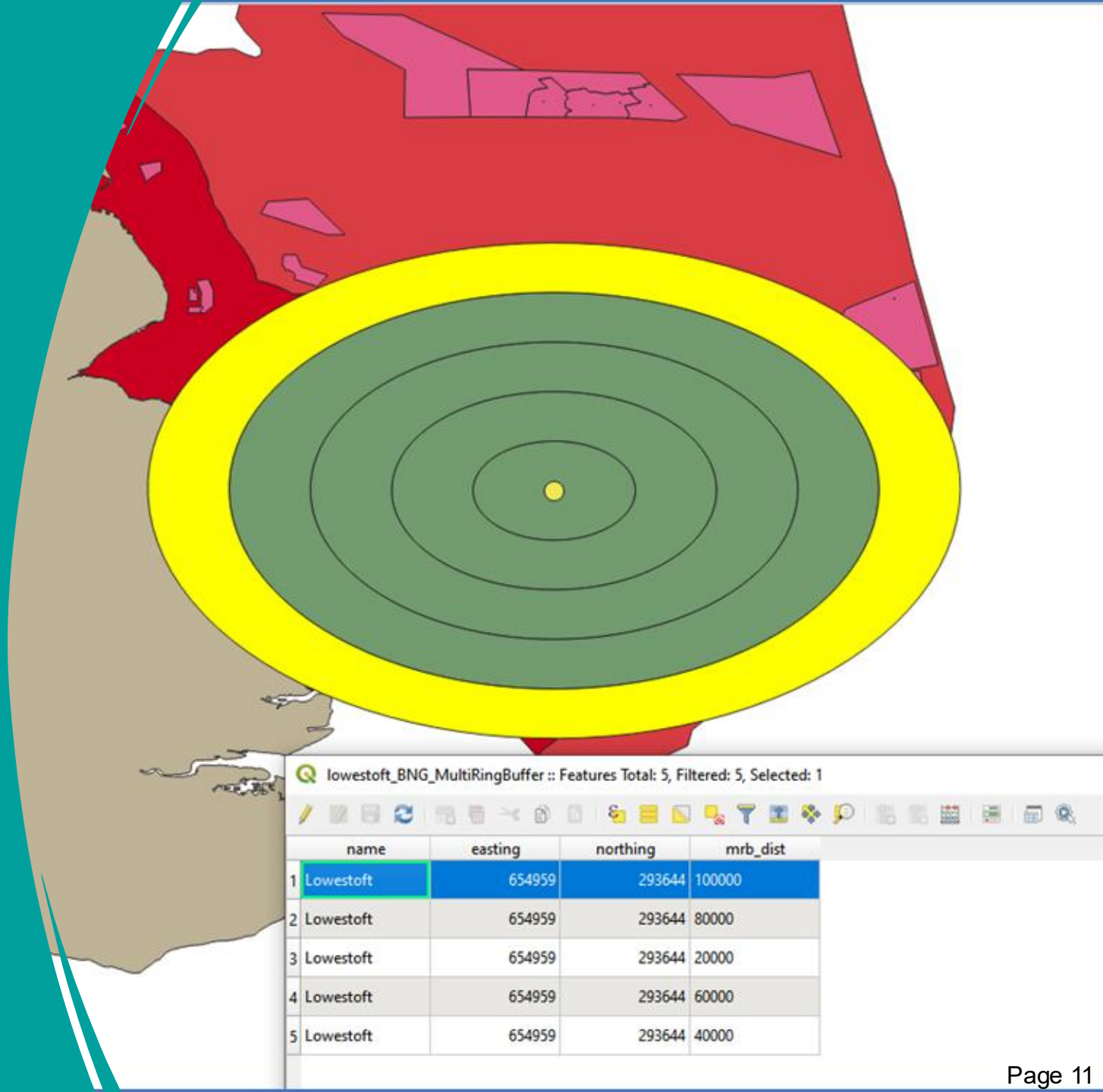
QGIS Module 6: Spatial Analysis

- **Loading rasters**
- **Mosaics (virtual raster)**
- Perform basic raster analysis using **raster calculator**
- **Symbology**
- Loading **netCDF** files



	name	easting	northing	mrb_dist
1	Lowestoft	654959	293644	100000
2	Lowestoft	654959	293644	80000
3	Lowestoft	654959	293644	20000
4	Lowestoft	654959	293644	60000
5	Lowestoft	654959	293644	40000

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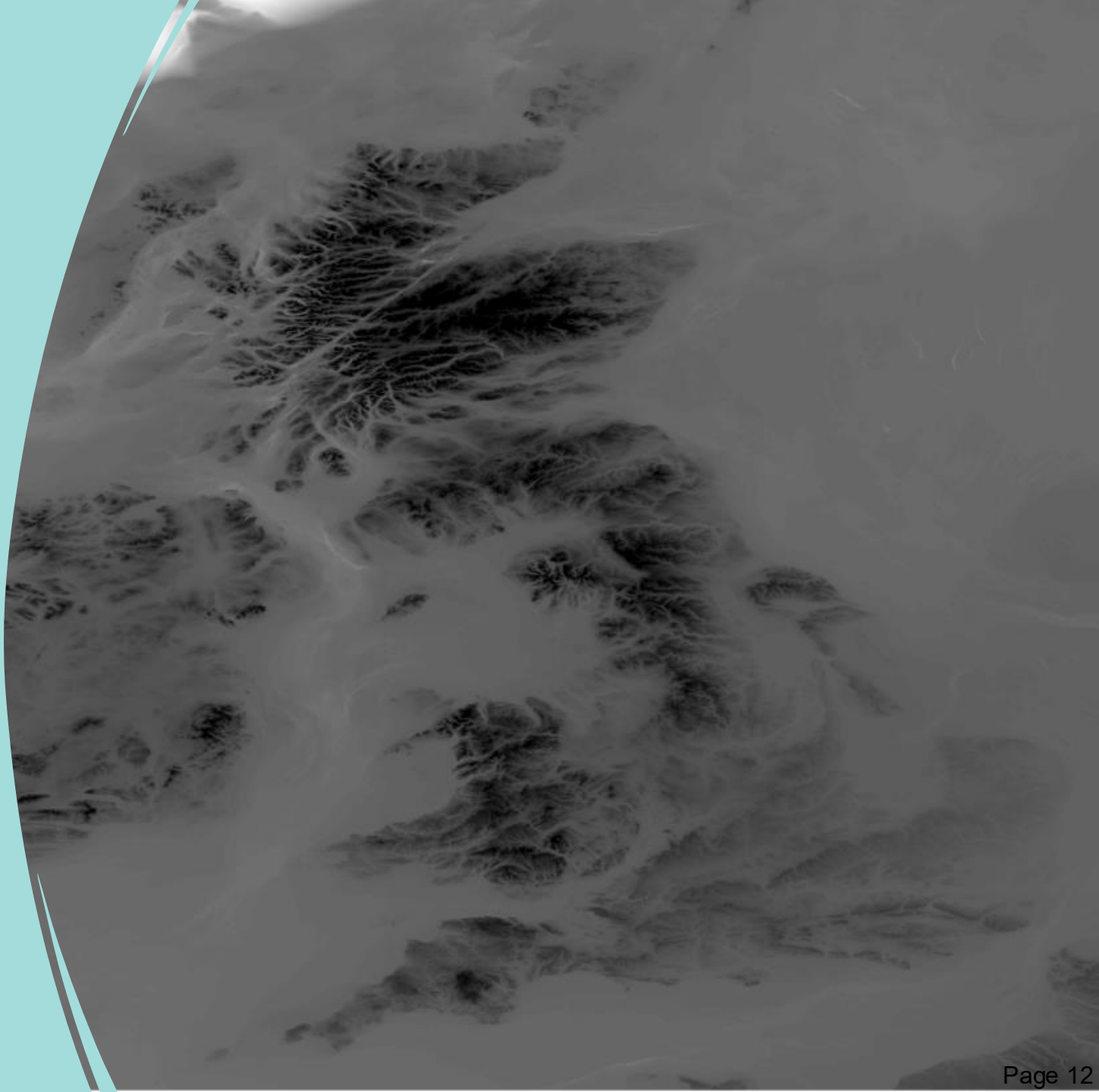
QGIS Module 7:
Spatial Analysis-case study

- **Loading rasters**
- **Mosaics (virtual raster)**
- Perform basic raster analysis using **raster calculator**
- **Symbology**
- Loading **netCDF** files



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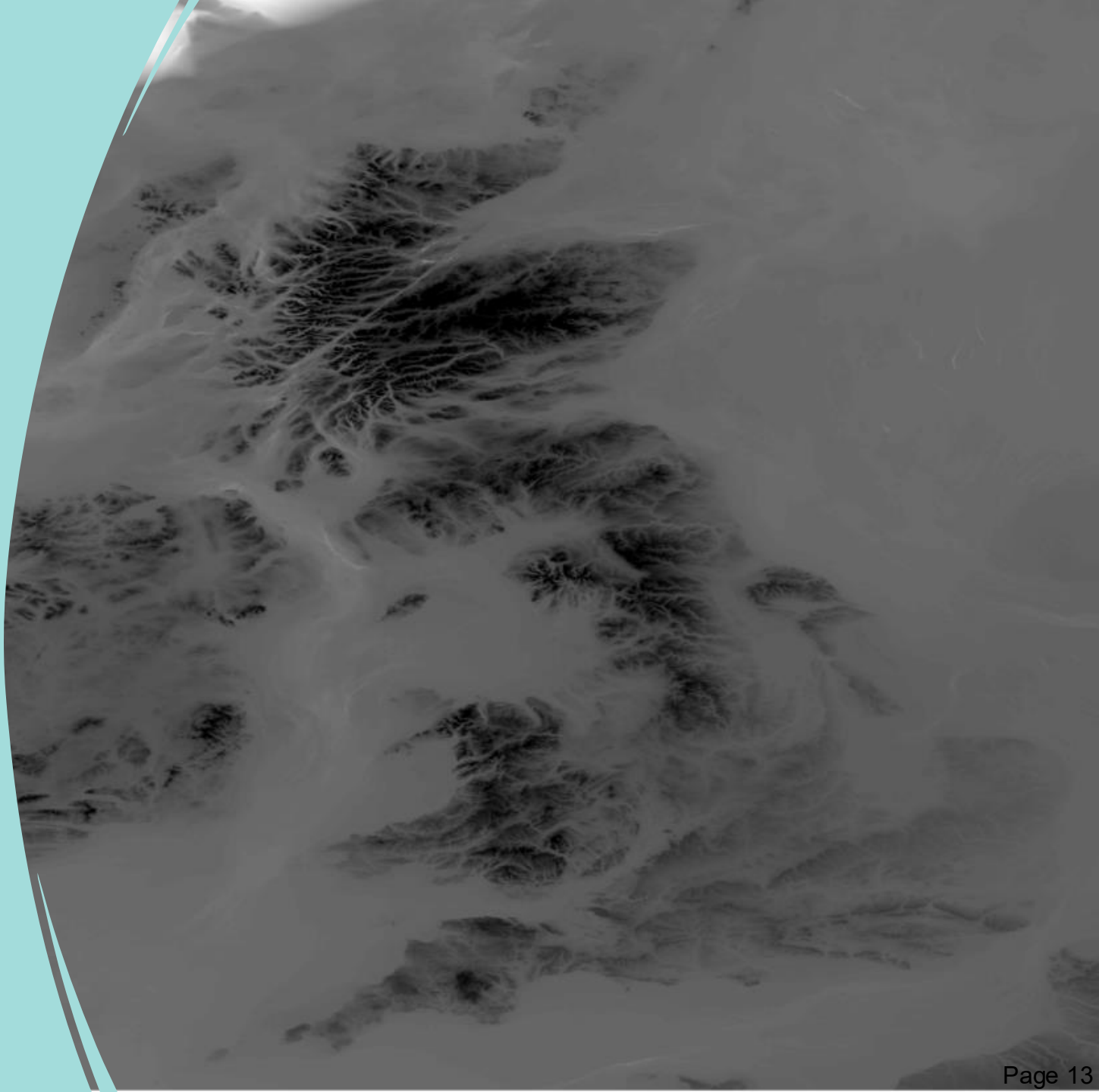
QGIS Module 8:
Data Collection Using QField Application and QGIS

- **Loading rasters**
- **Mosaics (virtual raster)**
- Perform basic raster analysis using **raster calculator**
- **Symbology**
- Loading **netCDF** files



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2. ArcGIS Pro Training Modules

Requirements and skills gained

Minimum hardware requirements: Laptop or PC 

Minimum software requirements: ArcGIS Pro 2.9.5. (used for this module)

Internet Access: Yes (to download data and software) 

License: Yes

Aims of the modules: provide general GIS skills and concepts 

Use of the modules: GIS concepts, creating spatial data, cartography, mapping 

GIS user level: Beginner

ArcGIS Pro Module 1: Introduction to ArcGIS Pro

- **Setting-up a new Project**, add folder connections, and add a new map.
- Add **new data**, navigate the data, **change the symbology**.
- Use **linked views** as part of new functionality.
- **Convert** an **ArcMap Map Document** into an **ArcGIS Pro Project**.
- **Differences** between ArcMap and ArcGIS Pro.

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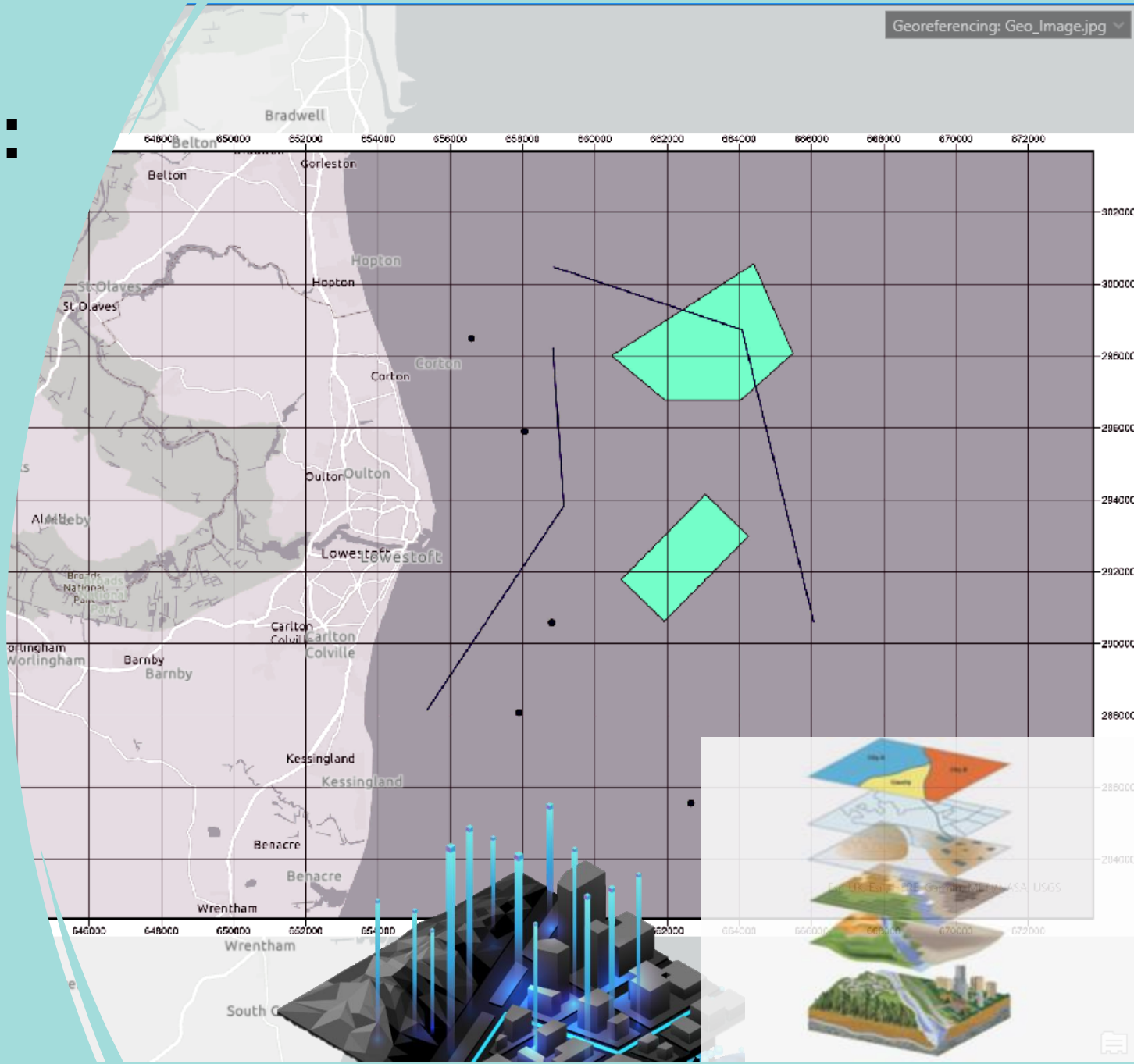
ArcGIS Pro Module 2: Data Creation and Handling

- **Create a point feature class** from an Excel spreadsheet.
- **Georeference an image**.
- Create **point, line and polygon data**.
- Convert a **NetCDF file** into a raster file.



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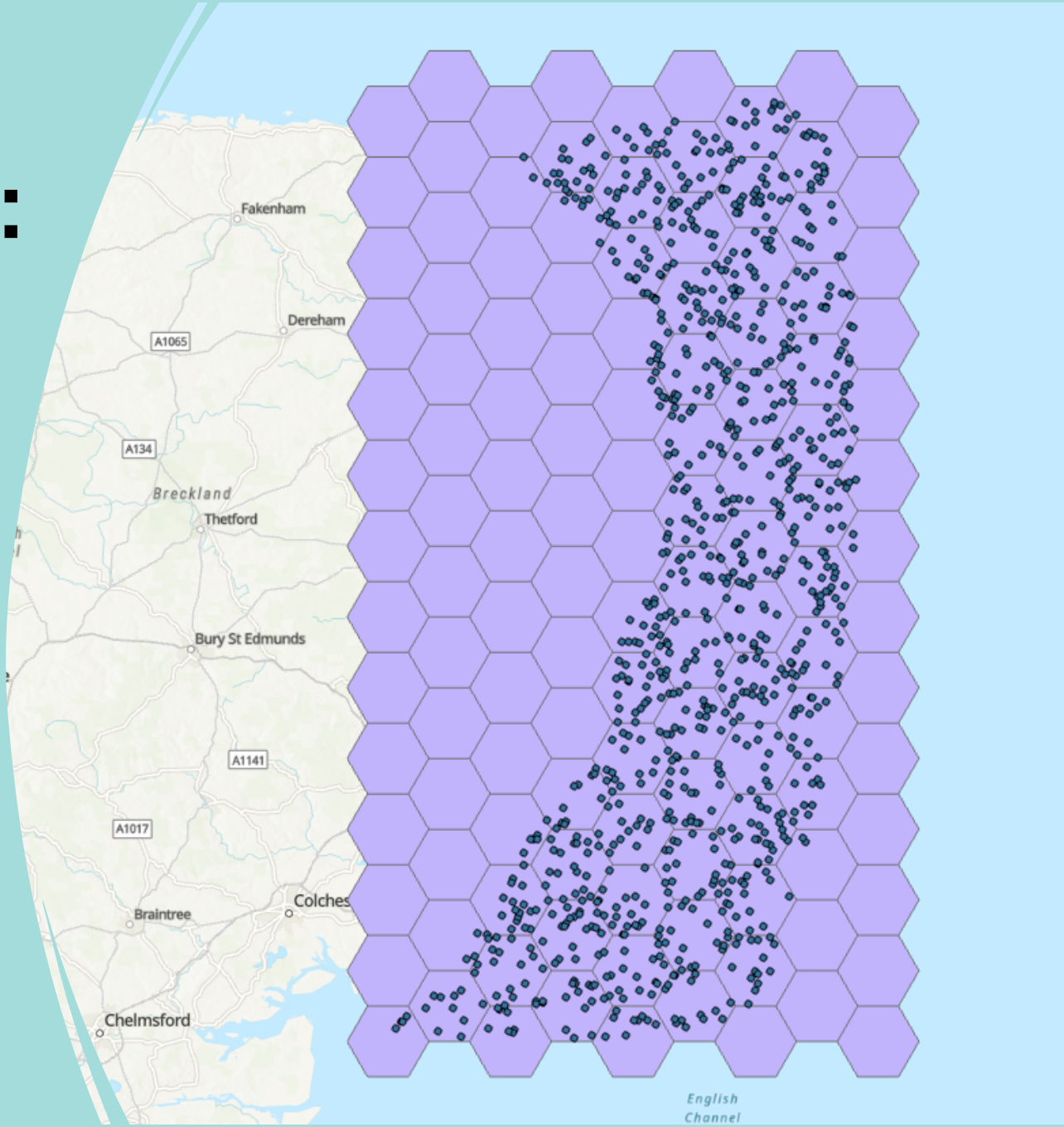
ArcGIS Pro Module 3: Spatial Analysis

- Hands on examples on **common spatial tasks:**
  - Buffer
  - Intersection
  - Area overlap calculation
  - Spatial and non-spatial joins.
  - Nearest distance



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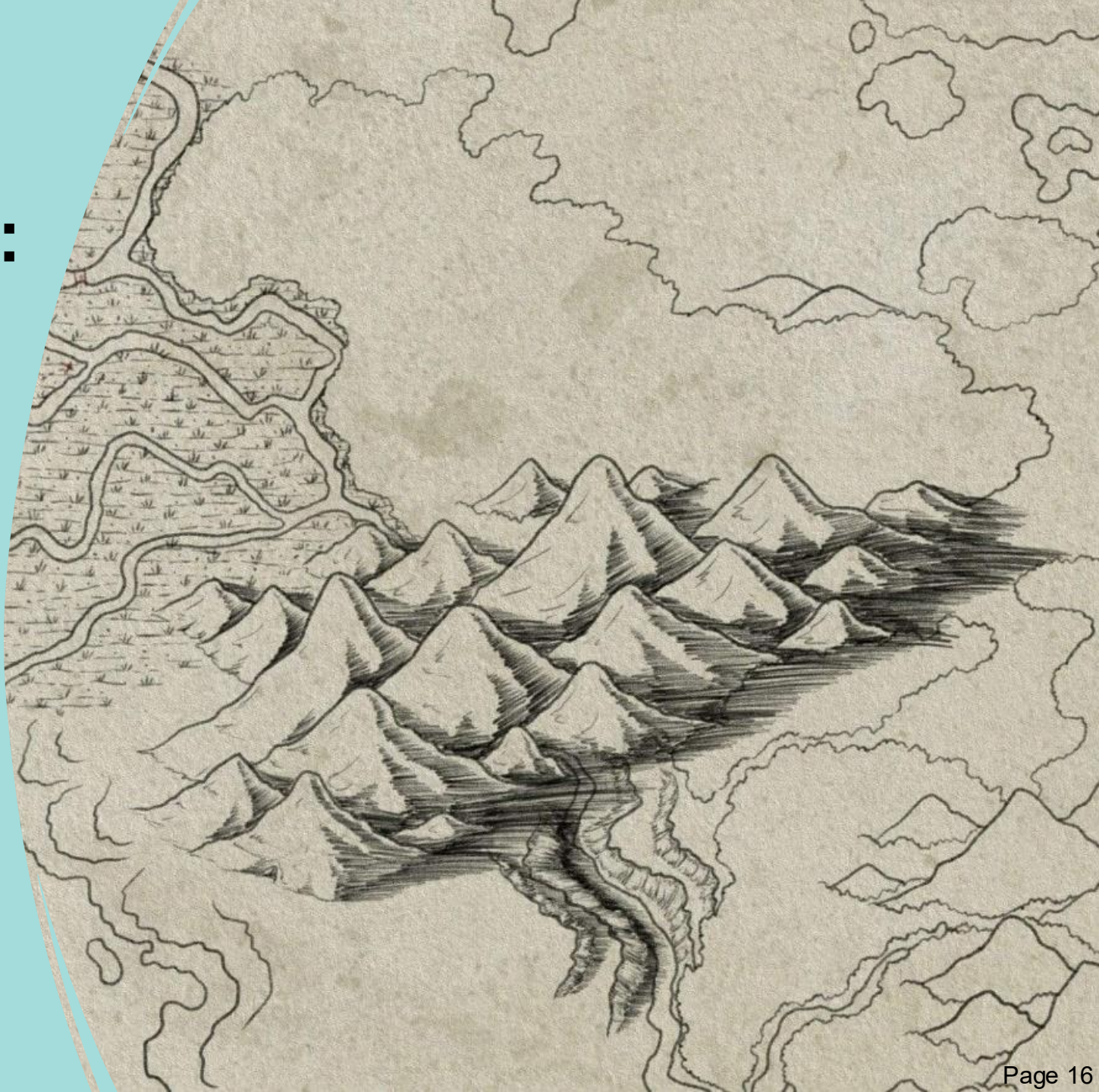
ArcGIS Pro Module 4: Cartography

- Setting-up a **map layout**
- Using guides and guidelines
- Adding **a grid**
- Adding an **inset map** (overview map)
- Adding **cartographic map features**, such as a scale bar, north arrow, legend
- Adding a text box
- **Exporting a map**



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ArcGIS Pro Module 5: Python Environment

- Introduction to **Jupyter Notebook**
- Cloning **ArcGIS Pro Python Environment**, adding new site packages
- Introduction to Integrated Development Environments (IDEs) **Spyder** and **PyCharm**

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3. ArcGIS Online or Enterprise

Requirements and skills gained

Minimum hardware requirements: Laptop or PC

Minimum software requirements: ArcGIS Online or Enterprise account (your own license is required)

Internet Access: Yes (to download data and software)

License: Yes

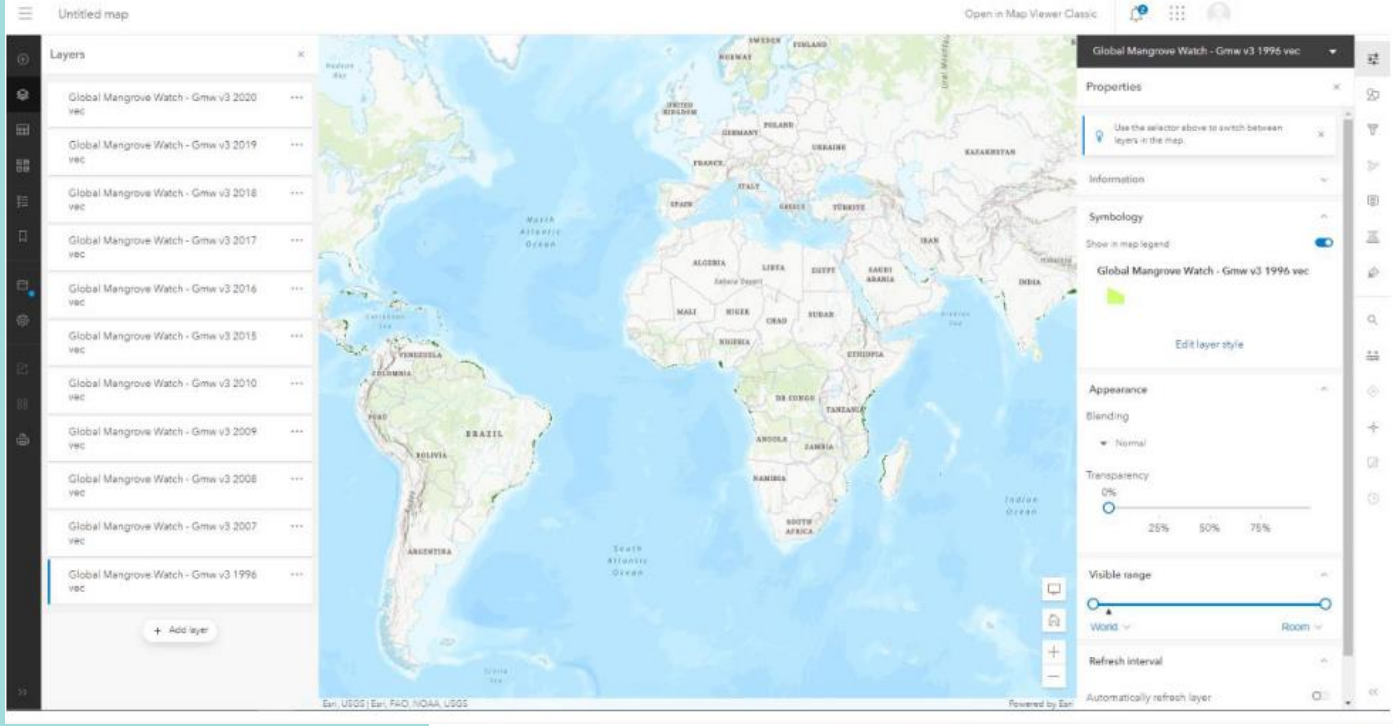
Aims of the modules: introduction to online web mapping and applications

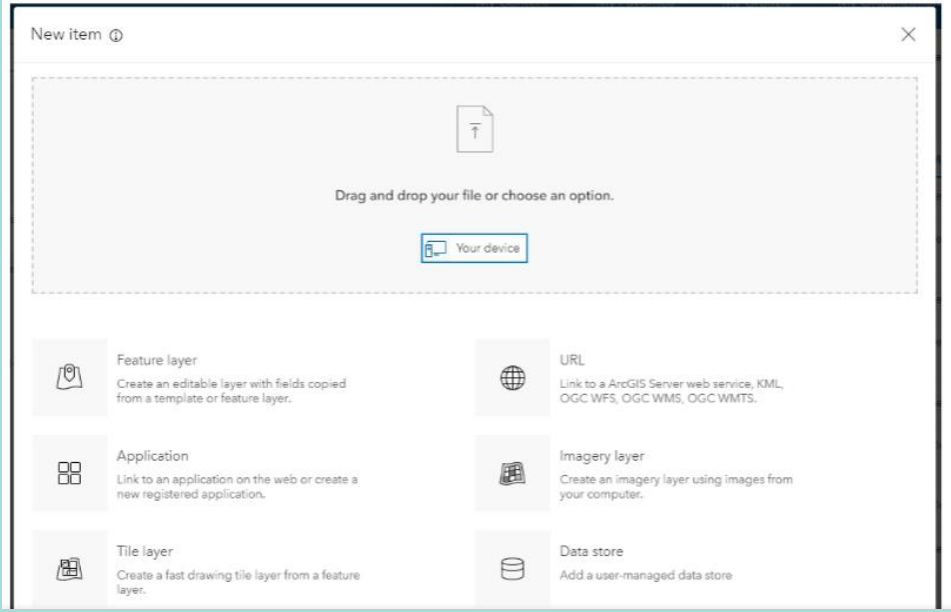
Use of the modules: online hosted data, web mapping, web products/applications

GIS user level: Improver (ArcGIS Pro modules are a pre-requisite)

Module 1: Introduction to ArcGIS Portal and ArcGIS Online

- Layout of ArcGIS Portal and Online.
- Add **new data**, **change the symbology**.
- User types and roles, groups and content sharing.





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Module 2: Introduction to ArcGIS Web Applications

- Using **Map Viewer** to create simple Web Maps.
- Add **new data.**
- Create an app using **ArcGIS Instant Apps.**
- Simple dashboard app creation using **ArcGIS Dashboards.**

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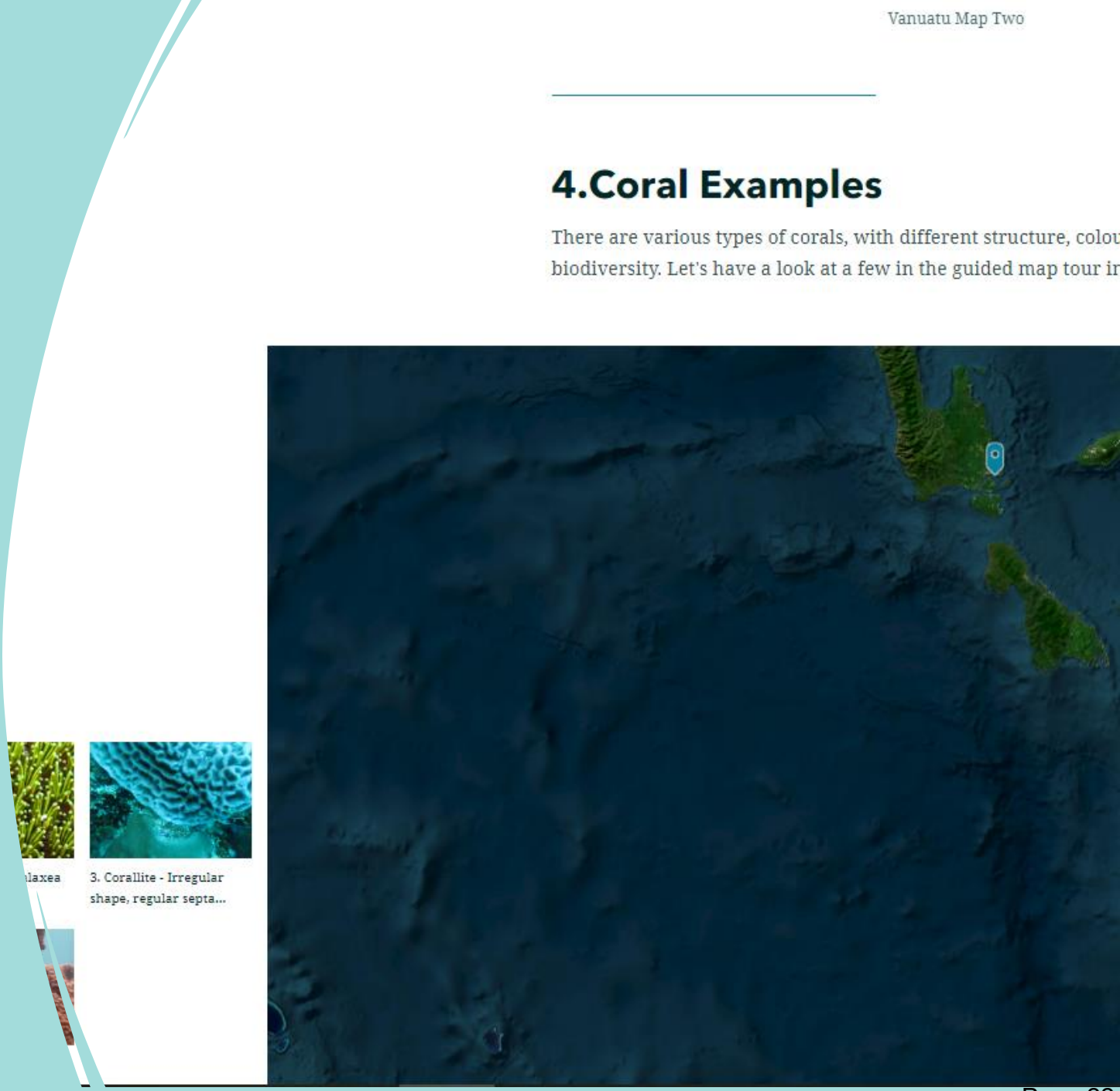
Module 3: Introduction to ArcGIS StoryMaps

- Recommended planning before making a StoryMap.
- Main storyMap **features.**
- **Hands-on example** of how to make a StoryMap focusing on corals in the Pacific Island of Vanuatu.



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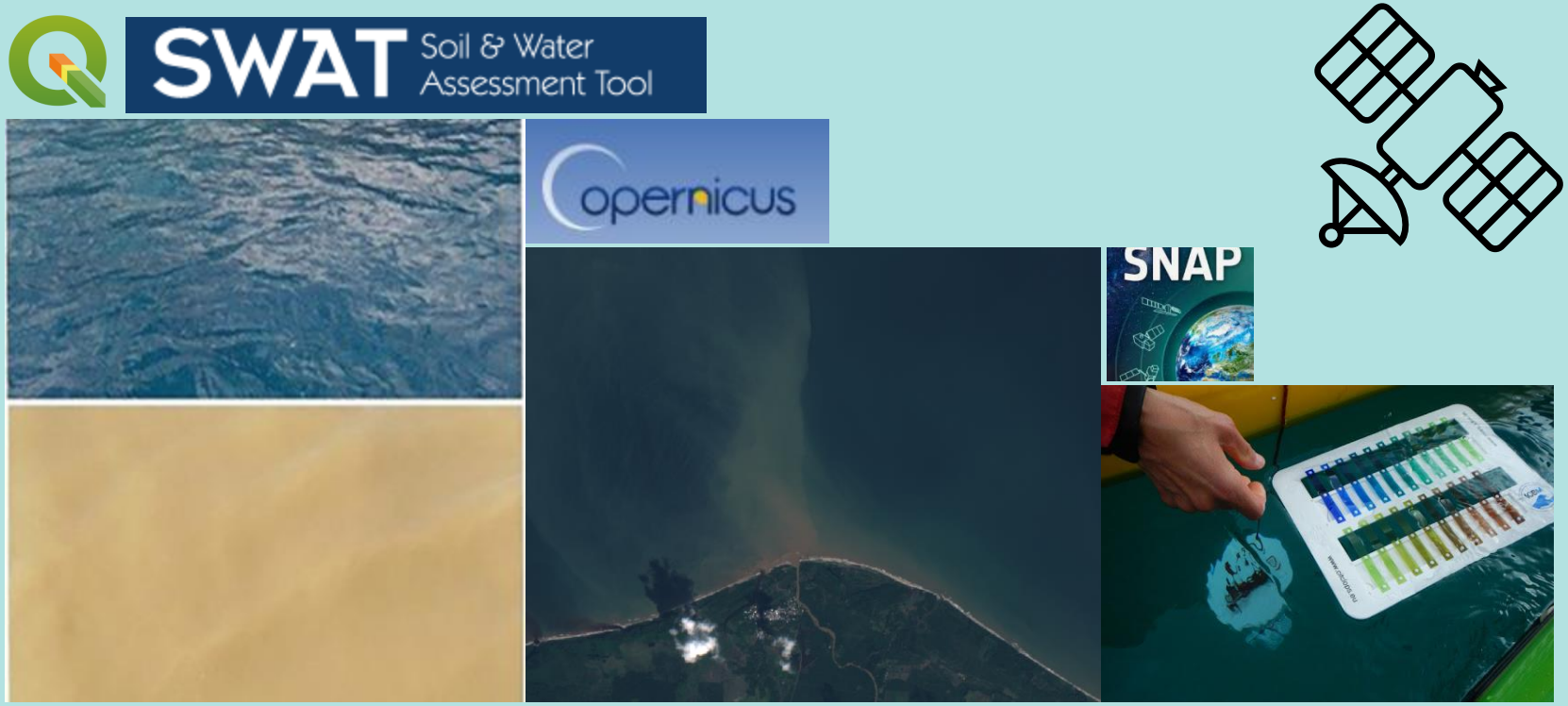
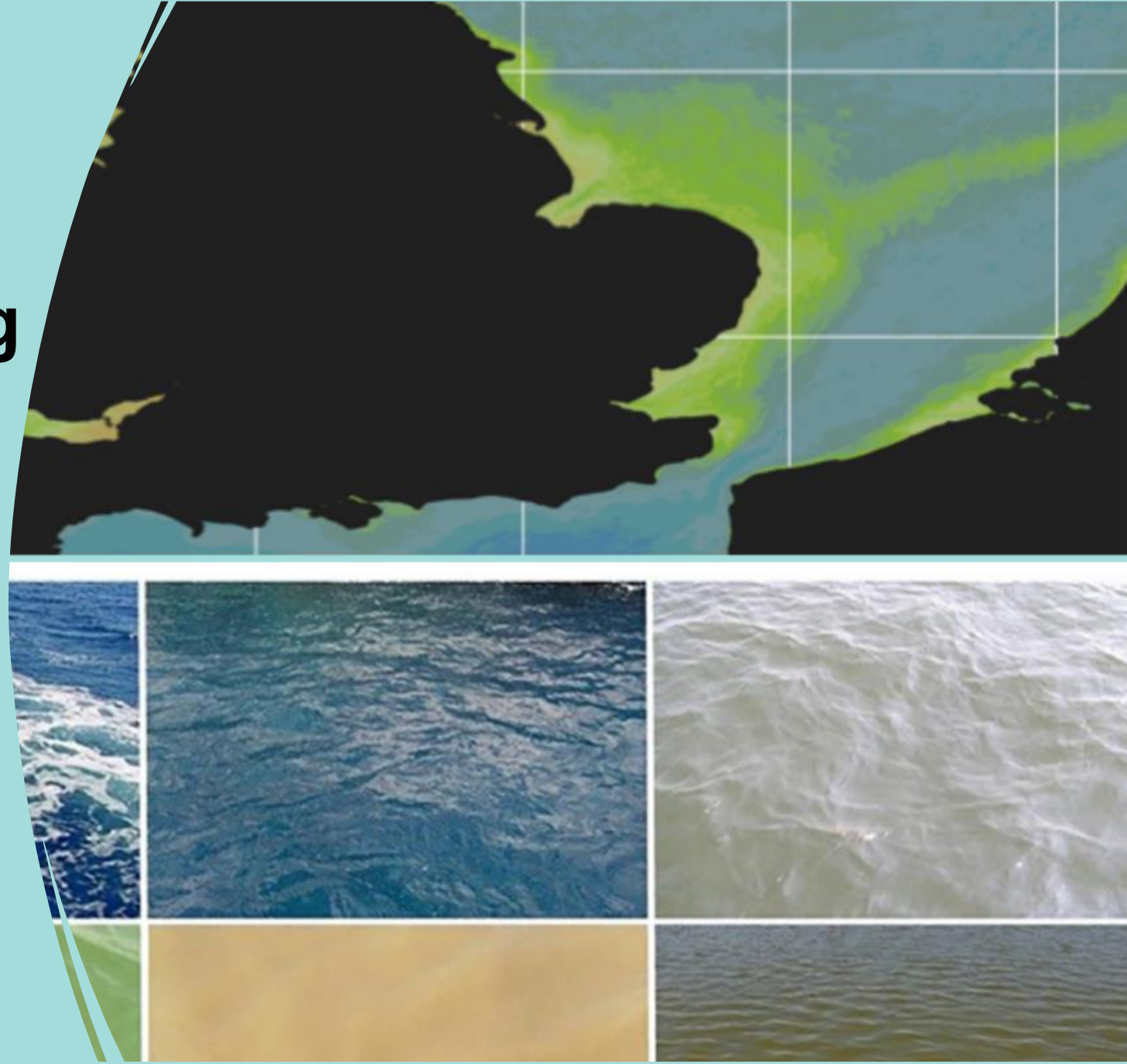
3. Remote Sensing and Pollution



River Plume Mapping

- Using **Sentinel 3 Ocean Colour data** to map river plumes using 2 methods that generate **Forel-Ule Index**
- **SNAP** (European Space Agency software) and **GPT**
- **FUME Python** repository
- **Extract plumes**



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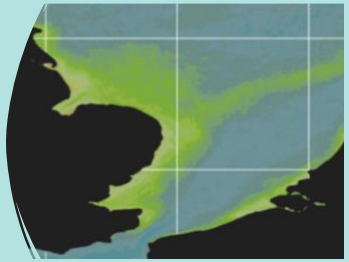

Requirements and skills gained from the Plume Mapping Module

Minimum hardware requirements: Laptop or PC

Minimum software requirements: SNAP (version 9.0.0.)

Internet Access: Yes (to download data and software)

License: No

Aims of the modules: Manual and scripted ways of downloading ocean colour data and calculating Forel-Ule

Use of the modules: water quality monitoring programs, plume risk mapping, pollution

User level: Beginner or Advanced (depending on which parts of the module is taken)

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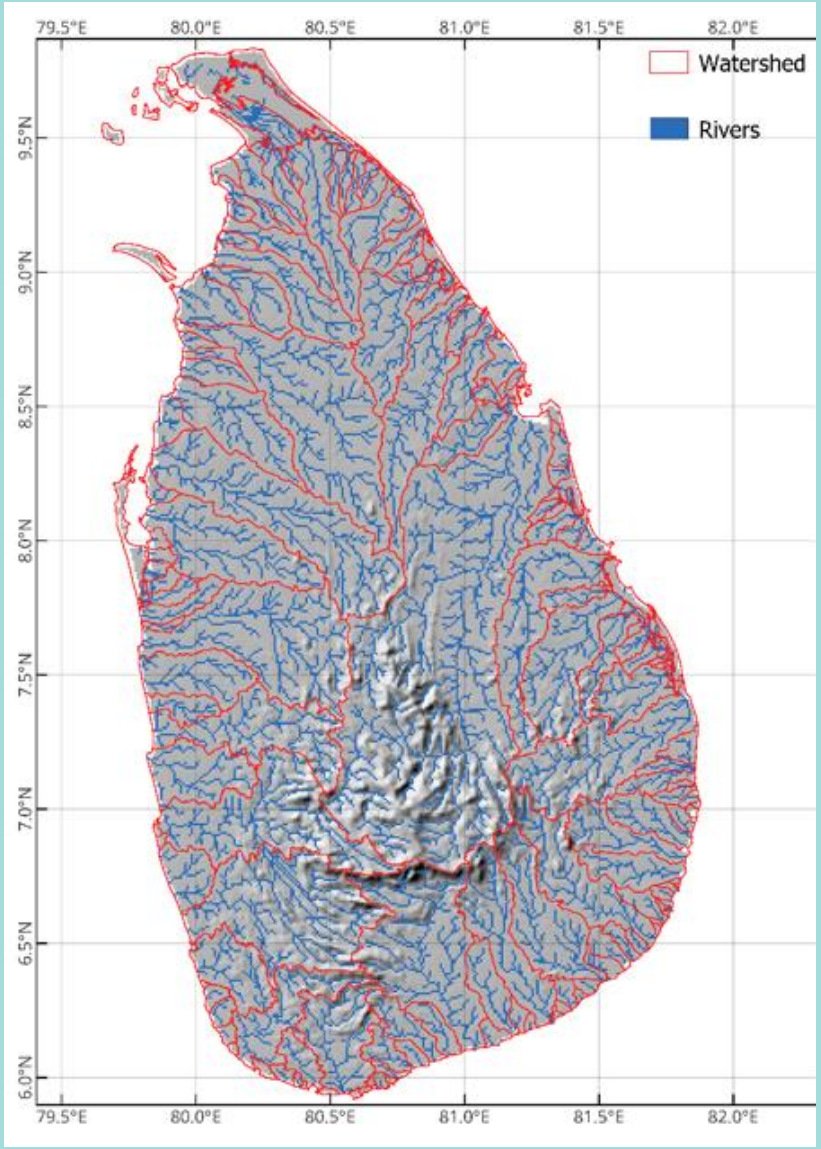
River Catchment Modelling with QSWAT+

SWAT Soil & Water Assessment Tool

- Introduction to SWAT+ (**S**oil and **W**ater **A**ssessment **T**ool)
- Information on how to build a baseline hydrological model of streamflow that can be used to model the flow and accumulation of pollutants across hydrological watershed
- Integrated in QGIS
- Mapping pollution



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Requirements and skills gained from the River Catchment Modelling with QSWAT+

Minimum hardware requirements: Laptop or PC 

Minimum software requirements: QGIS (version 3.16 used in this course but other should be compatible), QSWAT+ version 2.1.3., SWAT+Editor 2.1.4.

Internet Access: Yes (to download data and software) 

License: No

Aims of the modules: Creating a baseline hydrological model

Use of the modules: modelling water pollutants 

User level: Beginner but QGIS modules are recommended

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4. In Development

1. QGIS or open-source

Module 6: Introduction to databases (PostGIS in QGIS)

Module 7: Spatial Analysis

Module 8: Spatial plots in Python, R or Arcpy

Module 9: Introduction to QField App for field data collection

2. Remote Sensing and Pollution

Module 1: Introduction to Remote Sensing

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5. Funding

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1. UK Government through the Ocean Country Partnership Program (Blue Planet Fund)
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3. Darwin Initiative project DPLUS112: Capacity building in fisheries evidence, networks, and management (Virgin Islands).

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